PATENT CLAIMS

1. Apparatus for the production of ice-cream mass with solid ingredients, which comprises

a first through-flow freezer (1) for the cooling of a continuous flow of mass,

a second through-flow freezer (7) for further cooling of the continuous flow of mass, and

a mixing-in arrangement (6) for the mixing of solid ingredients into the continuous flow of mass between the first through-flow freezer (1) and the second through-flow freezer (7).

2. Apparatus according to claim 1, where the first through-flow freezer (1) cools the mass to between -1°C and -10°C, preferably between -3°C and -7°C, at the outlet of the first through-flow freezer (1).

3. Apparatus according to claim 1 or 2, where the second through-flow freezer (7) cools the mass to between -10°C and -20°C, preferably between -12°C and -16°C, at the outlet of the second through-flow freezer (7).

4. Apparatus according to any of the claims 1-3, where the mixing-in arrangement comprises a wing pump (6).

5. Apparatus according to any of the claims 1-4, where the second through-flow freezer (7) comprises a freezing cylinder with an inner, rotation-symmetrical freezing surface which is regularly scraped by rotation of a scraping arrangement (8).

6. Apparatus according to claim 5, where the scraping arrangement (8) is a conveyor screw which comprises a plurality of screw flights (13-20), each of which extends in a helical path around a longitudinal axis, where at least two screw flights (13-16)

extend over the same part of the longitudinal extent of the conveyor screw, and wherein the outer edges of the two screw flights (13-16) extend at different radial distance from the longitudinal axis.

7. Apparatus according to claim 6, wherein the said least two screw flights (13-16) extend over an inlet end part of the conveyor screw.

8. Apparatus according to claim 7, wherein at least three screw flights (13-16) extend over the inlet end part of the conveyor screw, and where one of the least three screw flights (13) extends at a greater radial distance from the longitudinal axis than the least two other screw flights (14-16).

9. Apparatus according to claim 8, wherein the at least two screw flights (14-16) which extend at a smaller radial distance from the longitudinal axis extend from the inlet end and at different longitudinal distance from the inlet end.

10. Apparatus according to any of the claims 6-9, where the pitch of the screw flights (13-16) at the inlet end of the conveyor screw is 0.9 to 1.4, preferably 1.1 to 1.3.

11. Apparatus according to any of the claims 6-10, wherein the pitch of the screw flights (17-20) decreases along the length of the conveyor screw to 0.7 to 1, preferably 0.8 to 0.9, at an outlet end of the conveyor screw.

12. Apparatus according to any of the claims 6-11, wherein at all places along the length of the conveyor screw there is at least one screw flight (13, 17-20) which extends at a given greater radius, so that the whole of the inner wall of a cylindrical cavity in which the conveyor screw is placed is scraped by rotation of the conveyor screw.

13. Apparatus according to any of the claims 6-12, wherein the screw flights (13, 17-20) which extend at a greater radial distance from the longitudinal axis extend discontinuously in the longitudinal direction, so that a peripherally extending opening exists between these screw flights (13, 17-20) at least at one position along the longitudinal direction.

14. Apparatus according to claim 13, wherein said opening or openings extend over 120 to 240° of the periphery, preferably over 150 to 210° of the periphery.

15. Apparatus according to any of the claims 6-14, wherein a second through-flow freezer comprises a driving element (W) which is arranged to drive the conveyor screw (8) at a speed of from 10 to 50 revolutions per minute, preferably from 20 to 35 revolutions per minute.